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(57) Abstract:

PROBLEM TO BE SOLVED: To obtain a member, useful as the one used in a production process for semiconductors and excellent in dimensional retention accuracy for a stress and a temperature changes, suppression of damage to a silicon wafer and prevention of particles from sticking by forming a titanium oxide film of a specific composition on the surface of a silicon nitride or sialon

having a specific average thermal expansion coefficient as a substrate and composing the member.

**SOLUTION:** This ceramic composite film is composed by forming a  $\text{TiO}_2$ -x  $[2 > (x) > 0]$  film or a film comprising a mixture composition of the  $\text{TiO}_2$ -x and  $\text{TiO}_2$  having the thickness of preferably  $\leq 1\%$  that of silicon nitride or sialon as a substrate which is a dense sintered compact, obtained by adding a sintering assistant, e.g.  $\text{Y}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$  or  $\text{MgO}$  in the total amount of  $\leq 15\%$  to the silicon nitride or sialon and sintering the resultant mixture by atmospheric sintering, gas pressure sintering or hot isostatic press (HIP) sintering and having  $\geq 95\%$  relative density and  $\leq 1.5 \times 10^{-6}/^\circ\text{C}$  average thermal expansion coefficient between  $20$  and  $50^\circ\text{C}$  on the surface of the substrate.

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